ALASKA DIRECT BROADCAST

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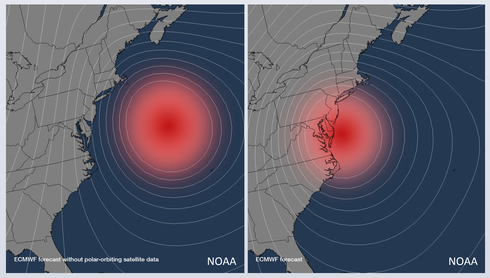
OVERVIEW

The Alaska Direct Broadcast project was initiated as part of the National Oceanic and Atmospheric Administration (NOAA) Sandy Supplemental to enhance the delivery of imagery and products derived from polar orbiting satellite data to the Alaska National Weather Service (NWS). The project is a collaboration among University of Alaska Fairbanks (UAF) Geographic Information Network of Alaska (GINA), National Environmental Satellite, Data, and Information Service (NESDIS), and National Weather Service (NWS). The project will promote best-effort, research products to 24/7 operational products by installing a new 3.0 m antenna and near-real time (NRT) processing and delivery capabilities at the NESDIS Fairbanks Command & Data Acquisition Station (FCDAS) in Fairbanks, Alaska. The project will deliver satellite imagery to the NWS that mitigates the risk of a data gap between Suomi National Polar-orbiting Partnership (SNPP) and Joint Polar Satellite System-1 (JPSS-1); including MODIS, POES AVHRR3, DMSP/OLS, and MetOP AVHRR3 products. In addition, redundant satellite acquisition and processing capabilities will be provided by a combination of new and existing assets at the UAF campus, thereby increasing acquisition and processing capacity and ensuring minimal interruptions to service.

ACCURATE, SWIFT DATA SAVES LIVES

Without Polar Orbiting satellite data, NOAA forecasts of severe storms such as Hurricane Sandy could be hundreds of miles in error. For example, weather models without polar orbiting satellite data showed Hurricane Sandy remaining at sea (left); with polar orbiting satellite data Sandy's landfall location was predicted within 30 miles, five days before its occurrence (right).



DATA DOWNLINK

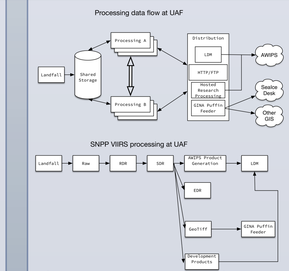
UAF

GINA operates a SeaSpace 3.6 m X-band antenna at the UAF. In operation since 2003, the Big Dog Antenna captures data primarily from SNPP, Terra, and Aqua.

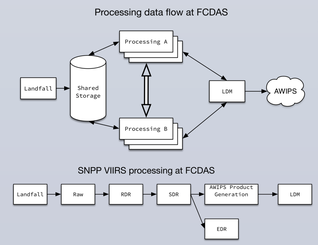
FCDAS

On April 8, 2015, the Alaska Direct Broadcast project installed a 3 m, X-, S-, and L-band Orbital Systems antenna at FCDAS. Sandy Dog will be in full operation by Summer 2015.

DATA PROCESSING



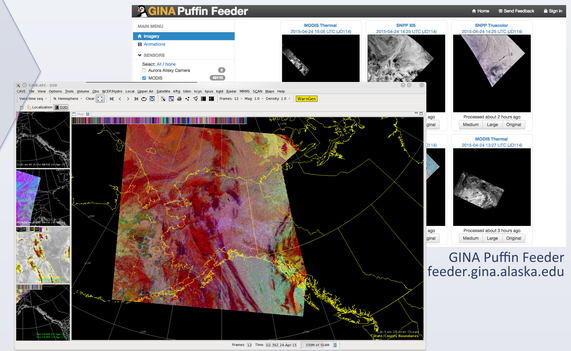
The Sandy Processing System hosted at UAF consists of 6 compute nodes and 4 storage nodes, and in Spring 2015 will include additional hardware to run research algorithms. The additional capacity will allow researchers to tap into the operational work already being done and provide low-latency access to development products to the NWS forecasters. It will also allow GINA's Puffin Feeder to generate products used by the NWS Ice Desk and River Forecasting.



The Sandy Processing System hosted at FCDAS consists of 6 compute nodes and 4 storage nodes. Processing is split into discrete steps, with output cached on shared storage. Each step can be run on two or more separate machines. This allows quick recovery in the event of a failure, ensuring minimal latency in delivery of products to the NWS.

DATA DISTRIBUTION

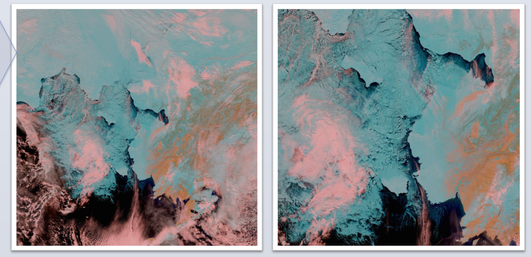
Redundant satellite acquisition and processing capabilities at UAF and FCDAS not only increase acquisition and processing capacity, but ensure minimal interruptions to data being delivered to AWIPSII and GINA's Puffin Feeder.



GINA Puffin Feeder
feeder.gina.alaska.edu

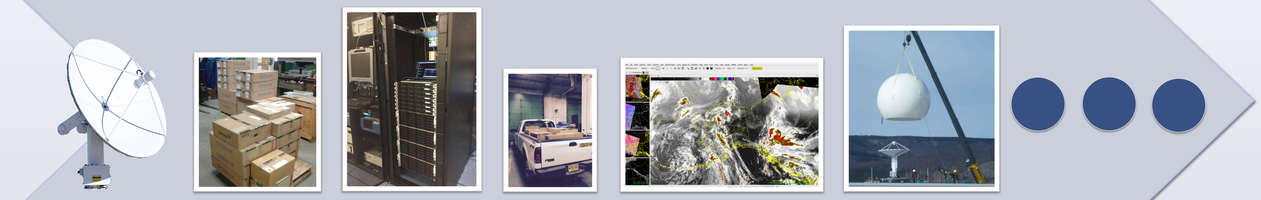
AWIPSII Interface

In addition to data sent to AWIPSII through LDM, the direct readout antenna data is used to create other products, such as this RGB imagery that the NWS Sea Ice Program uses to help chart sea ice in Alaska's waters.



Suomi NPP VIIRS Landcover RGB (321 I-Bands) 2015-04-15 23:51 UTC

IMPLEMENTATION SCHEDULE



MAY 2014
3 m Antenna ordered from Orbital

AUGUST 2014
Antenna fabrication and factory testing

SEPTEMBER 2014
UAF and FCDAS Processing Hardware procured
Antenna installation awarded to UAF

NOVEMBER 2014
Initial hardware and processor deployment

JANUARY 2015
Sandy processor hardware delivered to FCDAS

FEBRUARY 2015
SNPP data archive and product delivery to test AWIPSII

APRIL 2015
FCDAS antenna installation
UAF cloud computing procured
AVHRR & MODIS product(s) to AWIPSII

JUNE 2015
Integration of FCDAS processing system with NESDIS and NWS Direct Broadcast Networks
MetOP products to AWIPSII

AUGUST 2015
Deploy product monitoring and end-to-end metrics
Deploy Anchorage Sand Lake equipment
Verification and validation

Geographic Information Network of Alaska

Since 1993, GINA has operated L- and X-band direct readout satellite ground receiving stations on the UAF campus. GINA also receives data directly from NOAA/NESDIS acquisitions made at FCDAS facilities in Fairbanks and Barrow. As part of Alaska Direct Broadcast GINA added an L-, X- and S-band antenna at the NOAA/NESDIS site in Fairbanks. Satellite data are received and processed near-real time from the Suomi NPP, Terra, Aqua, Aura, DMSP, GCOM-W1, POES, and MetOp satellites. Distributed products include natural color, RGB, nighttime low light, and infrared imagery; as well as, wildfire hotspots, cloud and fog, and volcanic ash detection and tracking. Near-real time data products are made available within minutes to GINA's scientific and operational partners such as the National Weather Service, Alaska Fire Service, and Alaska Volcano Observatory.

Funding for GINA is provided by: University of Alaska, BLM Alaska Fire Service, Alaska Volcano Observatory, National Weather Service, National Park Service, Landscape Conservation Cooperatives, Alaska Energy Authority, National Science Foundation, Alaska Department of Natural Resources, National Science Foundation, National Park Service, Bureau of Ocean Energy Management, Alaska Energy Authority, NOAA NESDIS GOES-R and JPSS Programs, NASA, USDA Natural Resources Conservation Service, Arctic Landscape Conservation Cooperative, Japan Aerospace Exploration Agency, Alaska Statewide Digital Mapping Initiative, North Slope Science Initiative, AmericaView, Alaska, DNR DGGS, Coastal Impacts Assistance Program.